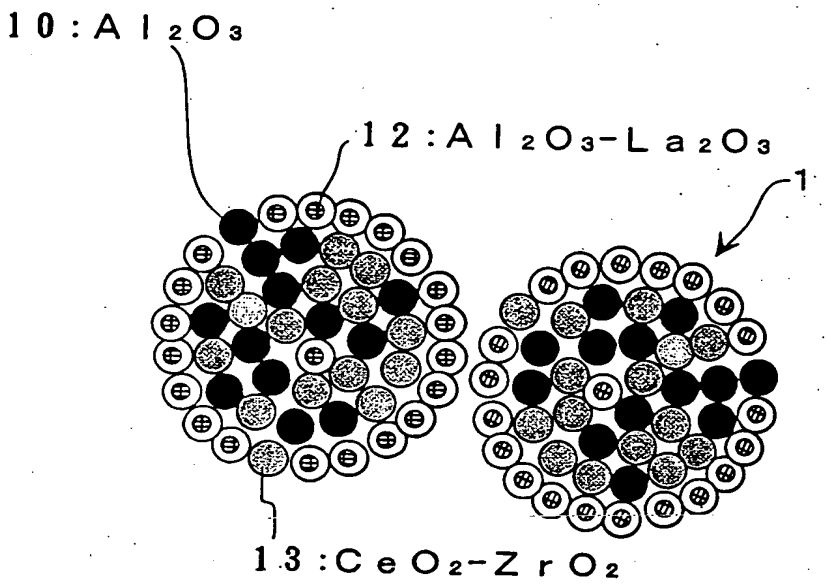
REMARKS

Applicants thank the Examiner and the Examiner's supervisor for the courtesy extended to Applicants' attorney during the interview held December 3, 2003, in the above-identified application. During the interview, Applicants' attorney explained the presently-claimed invention and why it is patentable over the applied prior art. The discussion is summarized and expanded upon below.

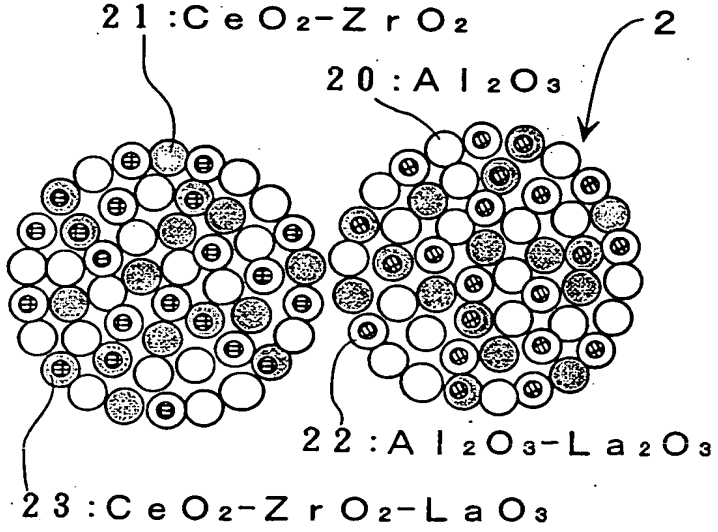
The present invention relates to a composite oxide, which is useful as a support for a catalyst for purifying an exhaust gas, a process for producing the same, a catalyst for purifying an exhaust gas, in which the composite oxide is employed as a support, and a process for producing the same.

As recited in, for example, above-amended Claim 1, the present invention is a composite oxide, comprising: agglomerated particles, each agglomerated particle comprising a plurality of fine particles, the agglomerated particles having an average particle diameter of 20 μm or less and the fine particles having an average diameter of 50 nm or less, wherein the plurality of fine particles comprises oxides of a plurality of metallic elements, and each fine particle independently comprises an oxide of one or more of said metallic elements, **said agglomerated particles having a surface and an inner portion, and wherein fine particles each having an oxide of the same metallic element or elements have a molar distribution in the surface portion that differs from the molar distribution in the inner portion.** (Emphasis added.)

The invention is exemplified by Fig. 1, which represents Example 1, described in the specification beginning at paragraph [0162], and which demonstrates the above-emphasized feature. The terms "surface" and "inner portion" are defined in the specification at paragraph [0047]. Fig. 1 is reproduced below:



As Fig. 1 shows, and as described in the specification at paragraph [0166], particles 12 are distributed more at the surface, while particles 10 and 13 are distributed more in the inner portion. The present invention can be contrasted with Fig. 2, which represents Comparative Example 1, described in the specification beginning at paragraph [0199], and reproduced below:



As Fig. 2 shows, and as described in the specification at paragraph [0202], the agglomerated particles had a substantially uniform metallic element distribution from the surface side to the inner portion. As described in the specification, and as shown by the wealth of comparative data therein, the structure of the claimed composite oxides herein results in better catalyst performance.

Other embodiments of the present invention are claimed in independent Claims 13, 15 and 33, as well as the dependent claims herein.

The claimed subject matter is neither disclosed nor suggested by the applied prior art.

The rejection of Claims 1-3 and 8 under 35 U.S.C. §103(a) as unpatentable over EP 1,020,216 (EP Suzuki et al), is respectfully traversed. EP Suzuki et al discloses a catalytic support including a mixture containing a porous oxide and a composite oxide, which mixture includes a particle having a particle diameter of 5 μm or more in an amount of 30% by volume or more (paragraph [0020]), wherein in the composite oxide particle, the average diameter of crystallite is not more than 10 nm (paragraph [0032]). There is no disclosure or suggestion in EP Suzuki et al that their composite oxide particle has the structure of the composite oxide claimed herein, i.e., agglomerated particles having a surface and an inner portion whose metallic element molar distributions differ with each other.

The Examiner relies on *In re Best*, 195 USPQ 430 (CCPA 1977). *Best* holds that the burden of disproving a finding that a property or characteristic is inherent in a claimed invention, is shifted to the Applicant when the finding is reasonable, as to process claims. *Best* also stands for the proposition that where claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an Applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product.

In reply, *Best* does not apply herein, because there is no reason to believe that the products claimed herein and those disclosed by EP Suzuki et al are identical or substantially identical, and they are not produced by identical or substantially identical processes.

In the Office Action, the Examiner admits that EP Suzuki et al "does not teach the elemental distribution found in the instant claims as to the concentration of the metallic elements on the surface or inner portion of the particle." The Examiner then finds that "[t]he claimed limitation of non-homogeneous distribution is not sufficient to distinguish from the compositions of the reference. The applicants have not shown how their composition differs from the suggestions of the applied reference."

In reply, the statutory scheme of Title 35 provides that a person is entitled to a patent **unless** certain facts apply. Thus, the initial burden is on the Examiner to demonstrate non-patentability, not on the Applicant to demonstrate patentability. According to *Best*, *supra*, that burden may be shifted to the Applicant only when it is reasonable to presume that the claimed invention and the prior art are identical or substantially identical. The Examiner has made no factual findings supporting such a conclusion. Rather, the Examiner simply requires, in the first instance, that Applicants show a lack of identity or substantial identity. On the other hand, if the Examiner's rationale is that notwithstanding a lack of identity or substantial identity, the claimed invention would have been obvious over EP Suzuki et al, the Examiner has still not made any factual findings as to why one of ordinary skill in the art would have found the presently-claimed invention obvious.

The following is offered in further distinction of the present invention vis-à-vis EP Suzuki et al.

When a precipitate is formed from a plurality of metallic acid salts (nitrate and the like) in aqueous solutions, the pH is remarkably changed by adding thereto an alkaline aqueous solution such as aqueous ammonia, or by adding the aqueous solution of metallic

acid salts to an alkaline aqueous solution, thereby forming a precipitate of hydroxide. In such a case, nucleation of primary particles of each component is generated almost simultaneously, so that non-uniformity in distribution of secondary particles in which the primary particles are agglomerated would be highly unlikely. In other words, uniformity of distribution will generally result. Such a method formation is exemplified in the Examples of EP Suzuki et al, wherein a plurality of metallic acid salts are treated as a mixture thereof. Such a method formation also corresponds to that of Comparative Example 1 herein, and as shown in above-discussed Fig. 2.

On the other hand, as described for the present invention, the step of forming a precipitate comprises more than two stages, so nucleation of the precipitate after the second stage is generated nearer the surface of an agglomerate (secondary particles) of fine (primary) particles which is generated in the first stage. Thus, the later in time a precipitate is formed for a component, the closer to the surface of an agglomerate of primary particles of multiple components will primary particles of said component be generally located, such as shown in above-discussed Fig. 1.

An advantage of the composite oxide in the present invention is now discussed.

It is known that the activity of a catalytic noble metal is affected by its compatibility with a support. For example, Rh which is an essential noble metal to a catalyst for automobiles, has excellent compatibility with ZrO_2 and Al_2O_3, but not necessarily with a basic oxide such as CeO_2. For example, for an exemplary composite oxide of the present invention, it is more preferable that Rh be loaded on primary particles of $Al_2O_3 + La_2O_3$ rather than on $CeO_2 + ZrO_2$. Generally, when noble metals are loaded on an oxide powder, loading starts from the surface side of secondary particles in order. Thus, when a noble metal is loaded on a composite oxide, the nearer the surface of a particular oxide in secondary particles thereof, the higher the concentration of that oxide.

In the present invention, where a composite oxide comprising secondary particles whose composition has non-uniformity is used, a greater amount of noble metal can be loaded on components of primary particles which are closest on the surface side. Namely, by controlling components on the surface of secondary particles, and by depositing a relatively greater concentration of primary particles, which are more compatible to noble metals, on the surface side, a more active loaded catalyst is obtained.

On the contrary, in the composite oxide of EP Suzuki et al, the composition has uniformity, and noble metals are loaded both on preferable primary particles and non-preferable primary particles almost uniformly.

The above discussion of noble metal loading is demonstrated by Fig. A **enclosed herewith**, wherein "cited reference" means EP Suzuki et al.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 1-4 and 8 under 35 U.S.C. §103(a) as unpatentable over either U.S. 6,150,288 (Suzuki et al '288) or U.S. 6,335,305 (Suzuki et al '305), is respectfully traversed. Suzuki et al '305 is the U.S. equivalent of, and is thus identical to, EP Suzuki et al, whose disclosure and deficiencies have been discussed above. Suzuki et al '288 discloses a composite oxide carrier in which component elements disperse with high homogeneity and more particularly a composite oxide catalyst crystallites of oxides of cerium and/or zirconium and secondary particles thereof, in which the sizes are decreased to a predetermined value or less, to enhance the heat resistance thereof as a composite oxide (column 1, lines 56-63). However, there is no disclosure or suggestion in Suzuki et al '288 that their composite oxide carrier has the same structure as the presently-claimed composite oxide, i.e., agglomerated particles having a surface and an inner portion whose metallic element molar distributions differ with each other.

The Examiner's discussion of the deficiencies of the applied prior art and Applicants' burden in overcoming this rejection is stated in substantially verbatim terms with that discussed for the rejection over EP Suzuki et al, *supra*. Thus, Applicants' reply to the rejection over EP Suzuki et al applies herein as well. Additionally, it is incongruous that the Examiner has included Claim 4 in the present rejection, but not in the rejection over EP Suzuki et al, when Suzuki et al '305 has an identical disclosure to EP Suzuki et al, as discussed above. What does the Examiner find is disclosed in Suzuki et al '305 that is not disclosed in EP Suzuki et al?

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 1-4 and 8 under 35 U.S.C. §103(a) as unpatentable over EP 0 778,071 (Suda et al) in view of U.S. 4,910,180 (Berndt et al), is respectfully traversed. Suda et al discloses a particle containing a solid solution of oxides in which one oxide is dissolved into the other oxide, and in which the degree of dissolution of one oxide into the other oxide is not less than 50%, and in which an average diameter of crystallite is not more than 100 nm (Abstract). The particle may contain ceria and zirconia (page 3, lines 46-49). However, Suda et al neither disclose nor suggest a composite oxide having the presently-claimed structure, i.e., agglomerated particles having a surface and an inner portion whose metallic element molar distributions differ with each other. Berndt et al does not remedy the above-discussed deficiencies in Suda et al. The Examiner relies on Berndt et al simply for a disclosure of particle size. However, even if the particles of Suda et al had the presently-recited particle size, the result would still not be the presently-claimed invention.

The Examiner finds that Suda et al "teaches the instantly claimed composite at page 2, line 9 et seq." The Examiner is incorrect, since the "instantly claimed composite" requires differing molar distributions as discussed above. The Examiner's rationale otherwise is

substantially identical to that in the other prior art rejections, discussed *supra*. Thus, the replies thereto apply herein as well.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 1, 13, 15, 26, 27 and 33 under 35 U.S.C. § 112, second paragraph, is respectfully traversed. The rejection would now appear to be moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that it be withdrawn.

The rejection of Claims 50, 53, 54, 56 and 57 under 35 U.S.C. § 112, second paragraph, is respectfully traversed. The rejection would now appear to be moot in view of the above-discussed amendment. In addition, Applicants respectfully submit that these claims were not indefinite, even before the above-discussed amendment. For example, since Claim 53 depends, by its terms, on Claim 26, it necessarily already has all the limitations of Claim 26. Claim 26 requires that the agglomerated particles have an average particle diameter of 20 μm or less. Thus, Claim 53, before the above-discussed amendment, could not be construed in such a way that the term "or more" was inclusive of an average particle diameter of greater than 20 μm. The same analysis can be made of all the rejected claims above. Furthermore, it is not understood why the Examiner only included the particular claims listed in the style of the rejection, since the Examiner's rationale would appear to apply to each of Claims 48-57.

For all the above reasons, it is respectfully requested that it be withdrawn.

All of the presently pending and active claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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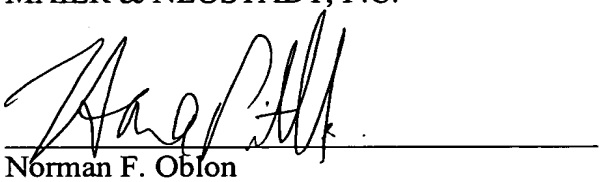
MAIER & NEUSTADT, P.C.



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